

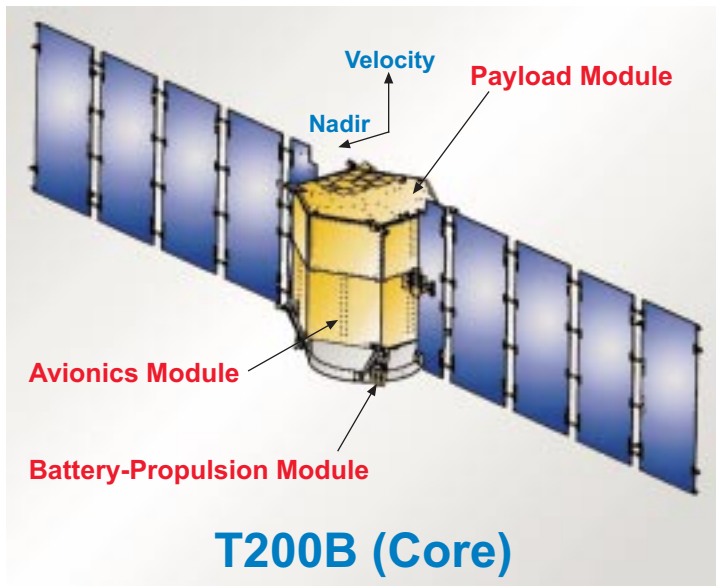


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Rapid Spacecraft Development Office

T200B Spacecraft



T200B in Assembly



T200B in Thermal Vacuum Chamber



T200B with Integrated Payloads

The T200B is an advanced, 3-axis stabilized spacecraft, capable of flying in low earth orbit at any inclination and eccentricity in the altitude range of 400 to 1,000 km and is expandable for geosynchronous applications. The system design is compatible with a number of small to medium launch vehicles (LVs) including Athena and Taurus. The composite structure results in a very strong, lightweight spacecraft with high payload mass fraction. The modular bus enables parallel manufacturing, and integration and test (I&T) that significantly reduces program schedule. Options for this spacecraft include upgraded payload mass and power capability and upgrades to allow use in geosynchronous orbit.

Key System Features

- Build to print version of SSTI-Lewis spacecraft with attitude control subsystem modifications (flight-proven on ROCSAT)
- All components available and flight qualified
- Modular design for easy growth and parallel AI&T
- Compatible with Athena, Taurus, Titan II, Delta
- Propellant capacity: 80.4 kg at 4:1 blowdown ratio
- Earth-oriented, three-axis, zero momentum bias
- Light-weight, high-stiffness composite structure
- Peak-power tracker, battery clamped power system with high-efficiency silicon (17%) solar arrays
- Monoprop propulsion system, with 8 1-lbf thrusters
- R3000 on-board computer (capable of 20 MIPS; T200B only uses 8)
- GSTDN compatible S-band transponder
- MIL-STD-1553B, and RS-422 payload interfaces

Payload Accommodations

- Performance calculated for reference orbit of 600 km, sun-synchronous
- Payload Mass up to 95 kg
- Payload on-orbit average power of 175 W
- Attitude control
 - Accuracy: 0.02° roll/pitch/yaw
 - Knowledge: 0.0016° roll and 0.0006° pitch/yaw
 - Jitter: <0.005° above 3 Hz per axis
 - Stability: 0.001°/sec, roll; 0.002°/sec pitch/yaw
- Power: Fused, relayed, unregulated 24 - 38.6 Vdc
- Data storage: 4 Gbits BOL (2 Gbits EOL)
- Total throughput capacity: 20 MIPS
- OBC SRAM: 2 MB, EEPROM: 1 MB
- Downlink rate: 2.048 Mbps
- Provides UTC time to payload to 1.0 millisc

T200B Key Subsystem Characteristics

Thermal Control

- Flight-proven passive techniques
- Dedicated radiators for battery, avionics, and payloads

Structure and Mechanisms

- Light-weight, modular, high stiffness composite structure
- Planar flat folding solar arrays with taper/hinges

Propulsion

- Monoprop hydrazine, blow-down system
- Thrusters location minimizes contamination effects
- 80 kg propellant tank

Electrical Power

- High efficiency silicon solar array
- 23 amp-hour NiH₂ battery
- Peak power tracked, battery clamped



Payload Platform

Payload Module

Avionics Module

Battery/Propulsion Module

Spacecraft

Modular design allows for parallel integration of the payload, avionics, and propulsion modules and ensures easy access to all components during I&T

Attitude Control

- Three Axis stabilized system
- Star trackers and Earth sensors, for attitude reference
- RWAs for momentum management
- Coarse sun sensors
- Magnetic torquers to unload momentum
- Gyro propagated attitude estimates
- Single axis solar array drives

Payload Module/Payload Platform

- Thermally isolated payload interface
- Provides unobstructed FOVs
- Internal payload mounting areas

Comm & Data Handling

- Flight-proven S-band RF and GPS
- 4 Gbits BOL/2Gbits EOL
- Redundant, 20-MIP R3000 OBC
- MIL-STD-1553 Data Bus

Program Schedule	Year 1												Year 2														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
Program Milestones	ATP		MDR														IIRR			PER			Deliver to Launch Site		Launch		Accept On-Orbit

T200B Mass and Power

T200B Performance

T200B in LVs

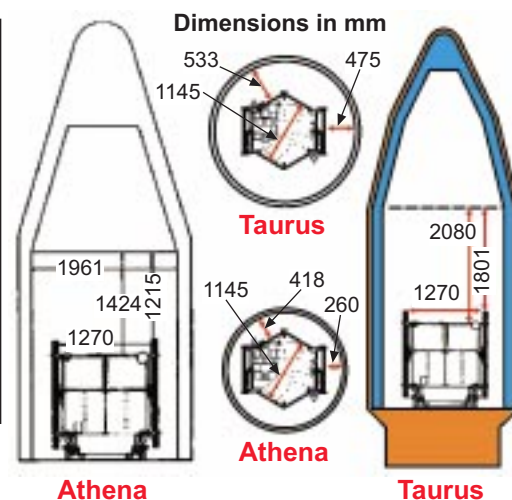
Subsystem		Mass, kg	Avg. Load W
Structure		80.1	-
Thermal		8.5	15.5
Propulsion		15.3	42.5
EPS with losses		73.5	342.1
Harness		27.9	-
ACS		39.3	43.4
C&DH/TT&C		27.4	60.8
LV Adapter		6.1	-
Total SC		278.0	504.3
Athena-1	Propellant *	45.0	-
	Payload	67.0	175.0
	Launch Total	390.0	679.3
Taurus	Propellant	75.0	-
	Payload **	95.0	175.0
	Launch Total	448.0	679.3

* Raises orbit within 30 days of launch

** Structural limit includes contingency

	Units	Capability
Spacecraft Bus Mass	kg	278
Spacecraft Bus Power	W	505
Payload Mass	kg	95 ⁽¹⁾
Payload Power (EOL)	W	175
Battery Size	amp-hr	23
Propellant Mass Capability	kg	80
Downlink Rate	Mbps	2.048
Data Storage (EOL)	Gbits	2
Attitude Knowledge - R/P/Y	arcsec	6/2
Attitude Accuracy - R/P/Y	arcsec	72

(1) Structural limit of spacecraft.



Successful Launch

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